

WHAT IS CLAIMED IS:

1. A mobile communication system comprising:

transmission control means for providing a vacant period,
in which no communication data is present, in one or more of
5 communication frames, and inserting a first control signal for
maintaining a communication quality in said vacant period.

2. A mobile communication system as set forth in claim 1,
wherein said transmission control means inserts said first
10 control signal at a predetermined time interval.

3. A mobile communication system as set forth in claim 2,
wherein said time interval is set to be longer than a time
interval of said first control signal in a communication mode
15 where transmission data are present in said communication
frame.

4. A mobile communication system as set forth in claim 1,
wherein said transmission control means provides a vacant
20 period from a timing immediately after a second control signal
for maintaining communication quality.

5. A mobile communication system comprising:

transmission control means for providing a vacant period,
25 in which no communication data is present, in one or more of

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communication frames from a timing immediately after a second control signal for maintaining communication quality.

6. A mobile communication system as set forth in claim 1,
5 wherein said transmission control means transmits a third control signal for maintaining communication quality immediately after end of said vacant period.

7. A mobile communication system as set forth in claim 1,
10 wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

8. A mobile communication system as set forth in claim 5,
15 wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

9. A mobile communication system as set forth in claim 6,
20 wherein said third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

10. A mobile communication system as set forth in claim 1,
25 wherein said first control signal includes a transmission power

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control information for reverse link.

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11. A mobile communication system as set forth in claim 5,
wherein said second control signal includes a transmission
5 power control information for reverse link.

12. A mobile communication system as set forth in claim 6,
wherein said third control signal includes a transmission power
control information for reverse link.

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13. A mobile communication system as set forth in claim 1,
wherein said first control signal includes a pilot signal to
be used for demodulation of the communication data or a
transmission power control for a forward link and a
15 transmission power control information for reverse link.

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14. A mobile communication system as set forth in claim 5,
wherein said second control signal includes a pilot signal to
be used for demodulation of the communication data or a
20 transmission power control for a forward link and a
transmission power control information for reverse link.

15. A mobile communication system as set forth in claim 6,
wherein said third control signal includes a pilot signal to
25 be used for demodulation of the communication data or a

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5 transmission control means for providing a vacant period
in which no communication data is present, in one or more of
communication frames, from a timing immediately after a second
control signal for maintaining a communication quality, and
transmitting a third control signal for maintaining the
10 communication quality immediately after end of said vacant
period,

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transmission control means for providing a vacant period
in which no communication data is present, in one or more of
communication frames, from a timing immediately after a second
control signal for maintaining a communication quality, and
20 transmitting a third control signal for maintaining the
communication quality immediately after end of said vacant
period,

said second control signal being a transmission power
25 control for a reverse link and third control signal being a

pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

18. A mobile communication system as set forth in claim 1,
5 wherein said vacant period is provided by compressing a transmission data in communication in a time link.

19. A mobile communication system as set forth in claim 1,
wherein a communication mode is switched into a mode where said
10 vacant period is provided at a predetermined time interval.

20. A mobile communication system as set forth in claim 1,
wherein a communication mode is switched into a mode where said
vacant period is provided by issuing a notice from said base
15 station to said mobile station.

21. A mobile communication system as set forth in claim 1,
wherein a communication mode is switched into a mode where said
vacant period is provided by issuing a notice to said mobile
20 station depending upon a link quality condition measured in said base station.

22. A mobile communication system as set forth in claim 1,
wherein a communication mode is switched into a mode where said
25 vacant period is provided by issuing a notice to said mobile

station depending upon a congestion condition measured in said base station.

23. A mobile communication system as set forth in claim 1,
5 wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice from said mobile station to said base station.

24. A mobile communication system as set forth in claim 1,
10 wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said base station depending upon a link quality condition measured in said mobile station.

15 25. A communication control method comprising:
a step of providing a vacant period, in which no communication data is present, in one or more of communication frames, and
a step of inserting a first control signal for
20 maintaining a communication quality in said vacant period, for transmission.

26. A communication control method as set forth in claim 25,
wherein said first control signal is inserted at a
25 predetermined time interval.

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wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

5 32. A communication control method as set forth in claim 29, wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

10 33. A communication control method as set forth in claim 30, wherein said third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

15 34. A communication control method as set forth in claim 25, wherein said first control signal includes a transmission power control information for reverse link.

20 35. A communication control method as set forth in claim 29, wherein said second control signal includes a transmission power control information for reverse link.

25 36. A communication control method as set forth in claim 30, wherein said third control signal includes a transmission power control information for reverse link.

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37. A communication control method as set forth in claim 25,
wherein said first control signal includes a pilot signal to
be used for demodulation of the communication data or a
5 transmission power control for a forward link and a
transmission power control information for reverse link.

38. A communication control method as set forth in claim 29,
wherein said second control signal includes a pilot signal to
10 be used for demodulation of the communication data or a
transmission power control for a forward link and a
transmission power control information for reverse link.

39. A mobile communication system as set forth in claim 30,
15 wherein said third control signal includes a pilot signal to
be used for demodulation of the communication data or a
transmission power control for a forward link and a
transmission power control information for reverse link.

20 40. A communication control method comprising:

a step of providing a vacant period in which no
communication data is present, in one or more of communication
frames, from a timing immediately after a second control signal
for maintaining a communication quality, and transmitting a
25 third control signal for maintaining the communication quality

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41. A communication control method comprising:

said second control signal being a transmission power control for a reverse link and third control signal being a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

43. A communication control method as set forth in claim 25, wherein a communication mode is switched into a mode where said vacant period is provided at a predetermined time interval.

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station depending upon a link quality condition measured in said mobile station.

49. A base station in a mobile communication system,
5 comprising:

transmission control means for providing a vacant period, in which no communication data is present, in one or more of communication frames, and inserting a first control signal for maintaining a communication quality in said vacant period.

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50. A base station as set forth in claim 49, wherein said transmission control means inserts said first control signal at a predetermined time interval.

15 51. A base station as set forth in claim 50, wherein said
time interval is set to be longer than a time interval of said
first control signal.

52. A base station as set forth in claim 49, wherein said
transmission control means provides a vacant period from a
timing immediately after a second control signal for
maintaining communication quality.

53. A base station in a mobile communication system,
25 ~~comprising:~~

transmission control means for providing a vacant period, in which no communication data is present, in one or more of communication frames from a timing immediately after a second control signal for maintaining communication quality.

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54. A base station as set forth in claim 49, wherein said transmission control means transmits a third control signal for maintaining communication quality immediately after end of said vacant period.

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55. A base station as set forth in claim 49, wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

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56. A base station as set forth in claim 53, wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

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57. A base station as set forth in claim 54, wherein said third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

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58. A base station as set forth in claim 49, wherein said first control signal includes a transmission power control information for reverse link.

5 59. A base station as set forth in claim 53, wherein said second control signal includes a transmission power control information for reverse link.

60. A base station as set forth in claim 54, wherein said
10 third control signal includes a transmission power control
information for reverse link.

61. A base station as set forth in claim 49, wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link and a transmission power control information for reverse link.

62. A base station as set forth in claim 53, wherein said
20 second control signal includes a pilot signal to be used for
demodulation of the communication data or a transmission power
control for a forward link and a transmission power control
information for reverse link.

25 63. A base station as set forth in claim 54, wherein said

third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link and a transmission power control ~~information for reverse link.~~

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64. A base station in a mobile communication system, comprising:

transmission control means for providing a vacant period in which no communication data is present, in one or more of communication frames, from a timing immediately after a second control signal for maintaining a communication quality, and transmitting a third control signal for maintaining the communication quality immediately after end of said vacant period,

15 each of said second and third control signals being a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

65. A base station in a mobile communication system, comprising:

transmission control means for providing a vacant period in which no communication data is present, in one or more of communication frames, from a timing immediately after a second control signal for maintaining a communication quality, and transmitting a third control signal for maintaining the

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communication quality immediately after end of said vacant period,

said second control signal being a transmission power control for a reverse link and third control signal being a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

66. A base station as set forth in claim 49, wherein said vacant period is provided by compressing a transmission data in communication in a time direction.

67. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided at a predetermined time interval.

68. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice from said base station to said mobile station.

69. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said mobile station depending upon a link quality condition measured in said base station.

70. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said mobile station
5 depending upon a congestion condition measured in said base station.

71. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant
10 period is provided by issuing a notice from said mobile station to said base station.

72. A mobile station in a mobile communication system, comprising:

15 quality measuring means for receiving a first control signal for maintaining a communication quality transmitted in a vacant period in which no communication data is present, in one or more of communication frames and measuring a reception quality on the basis of said first control signal; and

20 transmitting means for generating and transmitting a transmission power control information for a forward link according to said reception quality.

73. A mobile station in a mobile communication system,
25 comprising:

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demodulation means for receiving a first control signal for maintaining a communication quality transmitted in a vacant period in which no communication data is present, in one or more of communication frames and demodulating a communication data using the first control signal.

74. A mobile station in a mobile communication system, comprising:

means for receiving a first control signal for maintaining a communication quality transmitted in a vacant period in which no communication data is present, in one or more of communication frames and controlling a transmission power in a reverse link according to said first control signal.

75. A mobile station in a mobile communication system, comprising:

quality measuring means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no communication data is present, in one or more of communication frames and measuring a reception quality on the basis of said second control signal; and

transmitting means for generating and transmitting a transmission power control information for a forward link according to said reception quality.

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frames and receiving a third control signal for maintaining the communication quality transmitted at a timing immediately after said vacant period, and measuring a reception quality on the basis of said second or third control signal; and

5 transmitting means for generating and transmitting a transmission power control information for a forward link according to said reception quality.

79. A mobile station in a mobile communication system,
10 comprising:

demodulation means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no communication data is present, in one or more of communication frames and
15 receiving a third control signal for maintaining the communication quality transmitted at a timing immediately after said vacant period, and demodulating a communication data using said second or third control signal.

20 80. A mobile station in a mobile communication system, comprising:

quality measuring means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no
25 communication data is present, in one or more of communication

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frames and receiving a third control signal for maintaining the communication quality transmitted at a timing immediately after said vacant period, and measuring a reception quality on the basis of said third control signal;

5 transmitting means for generating and transmitting a transmission power control information for a forward link according to said reception quality; and

 means for controlling a transmission power in a reverse link on the basis of said second control signal.

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81. A mobile station in a mobile communication system, comprising:

 demodulation means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no communication data is present, in one or more of communication frames and receiving a third control signal for maintaining the communication quality transmitted at a timing immediately after said vacant period, and demodulating a communication data using said third control signal; and

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 means for controlling a transmission power in a reverse link on the basis of said second control signal.

82. A mobile station in a mobile communication system, comprising:

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demodulation means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no communication data is present, in one or more of communication frames and receiving a third control signal for maintaining the communication quality transmitted at a timing immediately after said vacant period, and demodulating a communication data using said third control signal;

quality measuring means for measuring a reception quality on the basis of said third control signal;

transmitting means for generating and transmitting a transmission power control information in a forward link according to the reception quality; and

means for controlling a transmission power in a reverse link on the basis of said second control signal.

83. A mobile station as set forth in claim 72, wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

84. A mobile station as set forth in claim 75, wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

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95. A mobile station as set forth in claim 72, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said base station depending upon a link quality condition measured in said mobile station.

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